

and gives easiness to grip the ball. Accordingly, operability and ball controllability can be enhanced. By the existence of the thickness adjusting member, the back of the leather panel is a flat face. Consequently, the difference in step caused by the folding does not appear on the surface of the leather panel.


A ball for a ball game according to the present invention is characterized in that the peripheral edge portion of the leather panel is folded toward the inside by about 180 degrees. According to such a structure, the folded portion of the leather panel is bonded onto the cover rubber layer or the reinforced layer. Therefore, even if peeling is caused on the panel joint, there is little possibility that the folded portion might be turned over to appear on the surface of the ball.

A ball for a ball game according to the present invention is characterized in that the peripheral edge portion of the leather panel is folded toward the inside by about 90 degrees. According to such a structure, the folded portion of the leather panel is not inserted between the cover rubber layer or the reinforced layer and the thickness adjusting member. Therefore, there is no possibility that the thickness of the folded portion might appear as an irregularity on the surface of the leather panel.

A ball for a ball game according to the present invention is characterized in that the leather panel is bonded in the joint to the adjacent leather panel. According to such a structure, water can be prevented from entering the joint of the leather panels. In addition, the peeling of the leather panel can be prevented so that durability can be enhanced.

A ball for a ball game according to the present invention is characterized in that a notch is formed in the folded portion of the leather panel. According to such a structure, the folding can easily be performed like a curved line.

A ball for a ball game according to the present invention is characterized in that the thickness adjusting member is made of a woven fabric. According to such a structure, the bias effect of the woven fabric can prevent the ball from being deformed when external force is applied to the ball. Also in the case where such external force to damage the leather panel is applied, the force is intercepted by the woven fabric so that the bladder can be protected.

A ball for a ball game according to the present invention is characterized in that the thickness adjusting member is made of a shock absorbing member. According to such a structure, the external force applied to the ball is absorbed and relieved by the shock absorbing member. Consequently, a feeling can become soft when the ball hits a human body.

A ball for a ball game according to the present invention is characterized in that the thickness adjusting member has a lamination structure of the woven fabric and the shock absorbing member. According to such a structure, the shock absorbing member and the bladder which are provided on the inside can be protected by the woven fabric, and the shock absorbing function can be obtained by the shock absorbing member.

A ball for a ball game according to the present invention is characterized in that the shock absorbing member is formed of a foaming member, a nonwoven fabric, a bulky woven fabric or a honeycomb construction member. According to such a structure, the shock absorbing member and the bladder which are provided on the inside can be protected by the woven fabric, and the shock absorbing function can be obtained by the shock absorbing member.

A ball for a ball game according to the present invention is characterized in that the reinforcing member is provided between the leather panel and the thickness adjusting member. According to such a structure, when force to extend the leather panel is applied by the internal pressure of the bladder, the reinforced member inhibits the extension so that the expansion of the ball can be suppressed. Also in the case where the external force to damage the leather panel is applied, the force can be intercepted by the reinforced layer so that the bladder can be protected.

A ball for a ball game according to the present invention is characterized in that the reinforced layer is made of a polyester film, a PVC film, a polyethylene film or a polypropylene film. According to such a structure, it is possible to obtain a reinforced layer having flexibility, light weight and small thickness.

- Please replace from page 8, line 17, through page 11, line 23, with the following:

In Fig. 1, the reference numeral 1 denotes an example of a soccer ball and the reference numeral 2 denotes a bladder made of an elastic material having air impermeability such as butyl rubber in the form of a spherical hollow body, into which compressed air is charged. The reference numeral 3 denotes a valve for injecting the compressed air into the bladder 2, an internal pressure being set to about  $1.0 \text{ kg/cm}^2$ . The reference numeral 4 denotes a reinforced member formed by winding a fiber, for example, a nylon filament having a length of about 3000 m onto the surface of the bladder 2 in every direction on a circumference. The quality of the ball can be enhanced and stabilized by the reinforced layer 4 as described above. The reinforced layer 4 can be formed by overlapping a plurality of woven fabrics such as cotton fabrics together and sticking them onto the surface of the bladder 2 or sewing the woven fabrics spherically as well as winding a thread as described above. In addition, elastomer such as polyurethane, polyester,

nylon or polyolefine which is molded spherically or rubber blended with a reinforced fiber can be used as the bladder. The bladder having such a structure itself has a reinforcing function.

Therefore, a special reinforced layer does not need to be provided. The reference numeral 5 denotes a cover rubber layer made of natural rubber or the like which is formed on the reinforced layer 4, and the reference numerals 6 denote a leather panel bonded onto the cover rubber layer 5 with an adhesive such as a CR (chloroprene) based adhesive. A thickness adjusting member 10 which will be described below is bonded onto the back of the leather panel 6.

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In the present embodiment, a whole spherical surface is covered with twelve pentagonal panels and twenty hexagonal panels onto which the thickness adjusting member 10 is bonded. The cover rubber layer 5 functions to strengthen the bonding of the leather panel 6 onto the thickness adjusting member 10. It is also possible to employ a structure in which the leather panel 6 is directly bonded onto the reinforced layer 4. In particular, if the sticking structure of the woven fabric or the sewing structure of the woven fabric is employed as the reinforced layer 4, the cover rubber layer 5 is omitted in many cases. Furthermore, the cover rubber layer 5 can also be formed only on the joints of the leather panels 6. An artificial leather (including a synthetic leather, and so forth) or a natural leather is used for the leather panels 6. A backing member made of a woven fabric or the like for reinforcement can also be bonded onto the back of the leather panel 6. In this case, the leather panel 6 is used including the backing member.

As shown in Figs. 2 and 3, the leather panels 6 have ends thereof folded toward the back side by about 180 degrees. Therefore, the bonded ends of the leather panels 6 have almost semicircular sections, on which a trench 7 having the same shape as the shape of the trench of a hand stitched ball is formed. When the leather panels 6 are to be bonded onto the cover rubber

layer 5, the butt joints of the leather panels 6 may be bonded. With such a structure, the leather panels 6 are not separated on the joints thereof so that water or the like can be prevented from entering from a stuck portion. Furthermore, the ball itself can be prevented from expanding. Consequently, durability can be enhanced.

In the case where the end of the leather panel 6 is to be folded toward the back side, folded portions 8 need to be provided with V-shaped notches 9 in the middle thereof as shown in Fig. 3. The reason is that each of sides S of the polygonal leather panel 6 is curved slightly outward along the spherical surface. Each of the folded portions 6 can have a width of about 1 to 10 mm, more preferably, about 3 mm.

The reference numeral 10 denotes a thickness adjusting member which is bonded onto a region surrounded by the folded portions 8 on the back of the leather panel 6 described above and is set to almost the same thickness as the thickness of the leather panel 6. More specifically, the leather panel 6 usually has a thickness of about 1.6 to 1.8 mm. Therefore, the thickness adjusting member 10 is also set to the same thickness. Consequently, a difference in step generated between the folded portions 8 and the back of the leather panel 6 can be eliminated. One or more woven fabrics can be used for the thickness adjusting member 10. In the case where a plurality of woven fabrics are used, they are overlapped and bonded with a latex paste or the like. Cotton fabrics or mixed to spinning of cotton and polyester is usually suitable for the woven fabric. If three or four woven fabrics are overlapped, the above-mentioned thickness can be obtained.

In a laminated ball, a shape thereof such as sphericity can be kept by the reinforced layer 4. Therefore, in the case where the leather ~~15~~ panel 6 is bonded onto the reinforced layer 4 directly or through the cover rubber layer 5, the leather panel 6 side is bent along the difference

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in step of the folded portions 8 and is bonded onto the reinforced layer 4 side when the thickness adjusting member 10 is not provided. Consequently, there is a problem in that a smooth spherical surface cannot be obtained. The thickness adjusting member 10 solves the problem, and changes the back of the leather panel 6 into a flat face so that the surface thereof is therefore made smooth.

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• Please replace from page 20, line 14, through page 21, line 25, with the following:

In one embodiment of the present invention, the quality such as sphericity, shape maintenance, durability or the like is kept equivalent to the quality of the laminated ball, and the leather panel joint has the trench having the same shape as in the hand stitched ball. Consequently, the air resistance can be reduced and the flight can be increased. Moreover, the trench causes the ball to be easy to grip. Therefore, operability and ball controllability can be enhanced. Furthermore, the surface of the leather panel presents a smooth sphere. Therefore, a product can become attractive. Furthermore, since the ball according to the present invention basically has a laminated ball structure, it can be mechanically manufactured. Consequently, stable quality and low cost can be achieved.

In one embodiment of the present invention, water can be prevented from entering from the joint of the leather panels. In addition, the peeling of the leather panel can be prevented so that durability can be enhanced.

In one embodiment of the present invention, the peripheral edge of the leather panel to achieve the ball surface which is usually polygonal and has each side curved slightly outward can easily be folded toward the back side. Consequently, there is no possibility that the sphericity might be deteriorated and irregularities might be generated on the joint of the leather panels.